

CLAIMS

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1. Hydrokinetic coupling apparatus, especially for a motor vehicle, comprising a casing (30) having a transverse wall (3) and adapted to be coupled in rotation to a driving shaft, a turbine wheel (12) mounted within the casing (30) and fixed to a hub (14) which is adapted to be coupled in rotation to a driven shaft, a fixed first surface (1) on the transverse wall (3) of the casing (30), and a lock-up clutch interposed between the said turbine wheel (12) and the said transverse wall (3) and comprising a piston (4) carrying a second surface (2), which lies facing the first surface (1) for coupling it releasably to the transverse wall, wherein a friction means (60) acts between a face of the piston (4) opposed to the second surface (2) and an element situated in facing relationship, characterised in that the piston (4) is so configured as to carry the friction means (60).

5. 2. Hydrokinetic coupling apparatus according to Claim 1, characterised in that the friction means (60) or the piston (4) has at least one projecting element (61, 166, . . .) engaged in a complementary hole (62, 66, . . .) of the other one of the elements consisting of the piston (4) and friction means (60).

10. 3. Hydrokinetic coupling apparatus according to Claim 2, characterised in that the hole (62, 66, . . .) is blind.

15. 4. Hydrokinetic coupling apparatus according to Claim 3, characterised in that the blind hole (62) is press-formed, or formed by drilling partway through or by extrusion.

20. 5. Hydrokinetic coupling apparatus according to Claim 2, characterised in that the hole (161) is a through hole.

25. 6. Hydrokinetic coupling apparatus according to any one of Claims 2 to 5, characterised in that the hole (66) has an oblong circumferential form.

30. 7. Hydrokinetic coupling apparatus according to any one of Claims 2 to 5, characterised in that the hole (164, 161) is cylindrical.

8. Hydrokinetic coupling apparatus according to Claim 1 or Claim 2, characterised in that rivet means (366, 666, 966, 1166) are interposed between the friction means (60) and the piston (4).

Sub 102/107

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9. Hydrokinetic coupling apparatus according to Claim 8, characterised in that the piston (4) carries at least one rivet (966, 1266) for fastening the friction means (60).

10. Hydrokinetic coupling apparatus according to Claim 9, characterised in that the rivet (666) is carried on the piston (4).

11. Hydrokinetic coupling apparatus according to Claim 9, characterised in that the rivet (966) is integral with the piston (4).

gray 12. Hydrokinetic coupling apparatus according to any one of Claims 8 to 11, characterised in that the head of the rivet (366) is engaged in a housing in the friction means (60).

102/103 13. Hydrokinetic coupling apparatus according to Claim 1, characterised in that the friction means (60) is of synthetic material and comprises at least one body (261) engaged in the hole in the piston (4) and sealingly closing off the said hole (161) after hot working.

gray 14. Hydrokinetic coupling apparatus according to any one of Claims 8 to 11, characterised in that the rivet head (966) is engaged in a rebate (866) in the friction means (60) after deformation.

102/103 15. Hydrokinetic coupling apparatus according to Claim 1, characterised in that the friction means (60) is formed by moulding over a projecting portion (1066, 1166, . . .) of the piston (4).

gray 16. Hydrokinetic coupling apparatus according to Claim 1 or Claim 2, characterised in that snap-fitting means (166, 1466, 161) are interposed between the piston (4) and the friction means (60).

25 17. Hydrokinetic coupling apparatus according to Claim 16, characterised in that the piston (4) has a projecting portion (1066) with a bead (1166), which may be of divided form, engaged in a hole of the friction means (60), such as a hole with a castellated contour. *having bastlements like a castle*

30 18. Hydrokinetic coupling apparatus according to Claim 17, characterised in that the friction means (60) includes a point engaged in a groove of a projecting portion (1066), having a terminal bead (1067), of the piston (4), and in that the groove is delimited by the piston (4) and the bead (1067).

35 19. Hydrokinetic coupling apparatus according to Claim 16, characterised in that at least one resilient lug (1466) having claws is engaged in a hole in the piston (4).

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20. Hydrokinetic coupling apparatus according to Claim 1 or Claim 2, characterised in that a seaming means (1066, 766) is interposed between the piston (4) and the friction means (60).

21. Hydrokinetic coupling apparatus according to Claim 18, 5 characterised in that the piston (4) has a projecting portion (1066, 102/103 2066) which is deformed by plastic flow of material into contact with a surface of the friction means (60) facing away from the piston (4).

22. Hydrokinetic coupling apparatus according to Claim 21, 10 characterised in that the surface (766) is defined by a reduction in thickness.

23. Hydrokinetic coupling apparatus according to any one of Claims 1 to 22, characterised in that the friction means (60) consists of a ring.

24. Hydrokinetic coupling apparatus according to any one of Claims 1 to 23, characterised in that the friction means (60) consists of a 15 plurality of annular sectors (160).

25. Hydrokinetic coupling apparatus according to any one of Claims 1 to 23, characterised in that the hub (14) has a radial plate (15) fixed to the turbine wheel (12), and in that the friction means (60) acts between the radial plate (15) and the piston (4).

26. Hydrokinetic coupling apparatus, especially for a motor vehicle, 20 comprising a casing (30) having a transverse wall (3) and adapted to be coupled in rotation to a driving shaft, a turbine wheel (12) mounted within the casing (30) and fixed to a hub (14) which is adapted to be coupled in rotation to a driven shaft, a fixed first surface (1) on the transverse wall (3) of the casing (30), and a lock-up clutch interposed between the said turbine wheel (12) and the said transverse wall (3) and comprising a piston (4) carrying a second surface (2), which lies facing the first surface (1) for coupling it releasably to the transverse wall (3), wherein the turbine wheel (12) includes an annular ring (13) 25 which may be of divided form and which is fixed to the hub (14) by means of a rivet (59), and wherein a friction means (60) acts between the hub (14) and the piston (4), characterised in that the friction means (60) is carried by at least one rivet (59).

27. Hydrokinetic coupling apparatus according to Claim 26, 30 characterised in that at least one rivet (59) has a head projecting towards the piston (4) and having a thickened portion (159, 259) for fastening the friction means (60).

1066 766 2066 160 130 120 110 100 90 80 70 60 50 40 30 20 10

obj. spec.

28. Hydrokinetic coupling apparatus according to Claim 27, characterised in that the thickened portion (159, 259) is at the free end of the head.

5 29. Hydrokinetic coupling apparatus according to Claim 28, characterised in that the thickened portion (159) is of constant width.

30. Hydrokinetic coupling apparatus according to Claim 29, characterised in that the thickened portion (259) is joined to the free end of the head through a portion of penetrating form.

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31. Hydrokinetic coupling apparatus according to any one of Claims 27 to 30, characterised in that the friction means (60) is moulded in place on the head.

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32. Hydrokinetic coupling apparatus according to any one of Claims 28 to 31, characterised in that the friction means (60) is snap-fitted on the thickened portion (159, 259).

15 33. Hydrokinetic coupling apparatus according to Claim 32, characterised in that the friction means (60) has a blind cavity (359) open towards the hub (14) for accommodating the thickened portion (159, 259).

20 34. Hydrokinetic coupling apparatus according to Claim 33, characterised in that the cavity (359) is delimited by L-shaped lugs (459) which are elastically deformable transversely and which are adapted to come into engagement with the face of the thickened portion facing away from the piston (4).

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35. Hydrokinetic coupling apparatus according to any one of Claims 28 to 30, characterised in that the friction means (60) is mounted on the thickened portion (159, 259) by a bayonet-type fitting.

36. Hydrokinetic coupling apparatus according to Claims 28 to 30, characterised in that the friction means (60) has, firstly, a cavity (360) open axially away from the piston (4) and being of oblong form circumferentially, for receiving the thickened portion (159), and secondly, an axially oriented passage (363) open on the side of the piston (4), and in that the passage is so dimensioned as to enable the thickened portion to penetrate into the cavity before being riveted on the hub.

30 37. Hydrokinetic coupling apparatus according to Claim 36, characterised in that the cavity (360) includes at least one hole (362) through which riveting is carried out.

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38. Hydrokinetic coupling apparatus according to any one of the preceding Claims, characterised in that the piston (4) surrounds the axially oriented annular portion (16) of the hub (14) with a radial clearance.

5 39. Hydrokinetic coupling apparatus according to any one of the preceding Claims, characterised in that the piston (4) is coupled to the casing (30) by axially elastic tongues (23), and in that the tongues (23) are radially outside the second surface (2).

10 40. Hydrokinetic coupling apparatus according to any one of the preceding Claims, characterised in that the friction means (60) has at least one passage (400) between its inner and outer peripheries to permit passage of a fluid.

15 41. Hydrokinetic coupling apparatus according to Claim 40, characterised in that the friction means (60) consists of a ring having, in at least one of its faces, a passage such as a groove extending from its inner periphery to its outer periphery.

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20 42. Hydrokinetic coupling apparatus according to any one of Claims 1 to 38, and 40 and 41, characterised in that the piston (4) is coupled to the casing (30) by axially elastic tongues (23), and in that the tongues (23) lie facing the second surface.

43. Hydrokinetic coupling apparatus according to any one of the preceding Claims, characterised in that the friction means (60) comprise a plurality of friction elements.

25 44. Hydrokinetic coupling apparatus according to any one of Claims 27 to 30, 32 to 37, and 38 to 43 taken in combination with any one of Claims 27 to 30 and 32 to 37, characterised in that the friction means (60) is mounted with an axial clearance with respect to the thickened portion (159), and in that the friction means (60) is in direct engagement on the turbine hub or on the turbine wheel (12).